IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A method ~~for transmitting high-frequency signals in an optical communication system, the method~~ comprising the steps of:

modulating an optical signal with a high-frequency signal and sending the modulated optical signal;

receiving the modulated optical signal;

combining ~~an optical~~ the received modulated optical signal, a first optical local component from a local light source and a second optical local component from the local light source to produce an electrical signal which includes plural electrical components, said second optical local component having a predetermined frequency differential [[from]] relative to a predetermined frequency of the first optical local component;

~~selecting a first high-frequency signal which consists of two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process; and~~

~~mixing the two selected electrical components included in the first high-frequency signal~~

selecting a first electrical component from said plural electrical components, said selected first electrical component being a frequency-shifted carrier component obtained from the combining of the modulated optical signal with the first optical local component;

selecting a second electrical component from said plural electrical components, said selected second electrical component being a frequency-shifted sideband component obtained

from the combining of the modulated optical signal with the second optical local component; and

demodulating to provide an output high-frequency signal using the first and second electrical components.

Claim 2 (Currently Amended): A method ~~for transmitting high-frequency signals in an optical communication system, the method~~ comprising the steps of:

modulating ~~transmitting~~ an optical signal ~~that includes~~ with a high-frequency signal of a predetermined frequency to provide an optical carrier component and an optical sideband component ~~obtained by modulation with a high-frequency signal whose frequency is predetermined~~;

sending the modulated optical signal;

receiving the modulated optical signal;

combining [[an]] the received modulated optical signal, a first optical local component from a local light source and a second optical local component from the local light source to produce an electrical signal which includes plural high-frequency electrical signal components, said second optical local component having a predetermined frequency differential relative to a predetermined frequency of [[from]] the first optical local component;

selecting a first high-frequency electrical signal component from said plural high-frequency electrical signal components ~~which consists of two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process; and~~, said first high-frequency electrical signal component including a frequency-shifted carrier component obtained from the combining of the modulated optical signal with

the first optical local component and including a frequency-shifted sideband component obtained from the combining of the modulated optical signal with the second optical local component;

combining the frequency-shifted carrier component and the frequency-shifted sideband component;

selecting a second high-frequency electrical signal component ~~whose~~ having a frequency [[is]] lower by an amount of the predetermined frequency differential [[than]] relative to a carrier frequency of the first high-frequency electrical signal component ~~obtained by the optical frequency mixing process~~; and

demodulating to provide an output high-frequency electrical signal using the second high-frequency electrical signal component.

Claim 3 (Withdrawn): A method for transmitting high-frequency signals in an optical communication system, the method comprising the steps of:

transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

extracting an original high-frequency signal from the transmitted optical signal;

combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

making a carrier frequency of the extracted original high-frequency signal coincide with the predetermined frequency differential; and

selecting two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process.

Claim 4 (Withdrawn): A method for transmitting high-frequency signals in an optical communication system, the method comprising the steps of:

transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

selecting, as a first optical signal, lights containing the optical sideband component included in the optical signal and the first optical local component from the local light source;

selecting, as a second optical signal, lights containing the optical carrier component included in the optical signal and the second optical local component from the local light source; and

selecting a signal with a relatively low frequency after mixing the first and second optical signals.

Claim 5 (Currently Amended): An apparatus ~~for transmitting high-frequency signals in an optical communication system, the apparatus~~ comprising:

means for modulating an optical signal with a high-frequency signal and sending the modulated optical signal;

means for receiving the modulated optical signal;

means for combining [[an]] the received modulated optical signal, a first optical local component from a local light source and a second optical local component from the local light source to produce an electrical signal which includes plural electrical components, said second optical local component having a predetermined frequency differential [[from]] relative to a predetermined frequency of the first optical local component;

~~means for selecting a first high-frequency signal which consists of two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process; and~~

~~means for mixing the two selected electrical components included in the first high-frequency signal~~

means for selecting a first electrical component from said plural electrical components, said first electrical component being a frequency-shifted carrier component obtained from the combining of the modulated optical signal with the first optical local component;

means for selecting a second electrical component from said plural electrical components, said second electrical component being a frequency-shifted sideband component obtained from the combining of the modulated optical signal with the second optical local component; and

means for demodulating to provide an output high-frequency signal using the first and second electrical components.

Claim 6 (Currently Amended): An apparatus ~~for transmitting high-frequency signals in an optical communication system, the apparatus~~ comprising:

means for ~~transmitting~~ modulating an optical signal ~~that includes~~ with a high-frequency signal of a predetermined frequency to provide an optical carrier component and an optical sideband component ~~obtained by modulation with a high-frequency signal whose frequency is predetermined~~;

means for sending the modulated optical signal;

means for receiving the modulated optical signal;

means for combining [[an]] the received modulated optical signal, a first optical local component from a local light source and a second optical local component from the local light source to produce an electrical signal which includes plural high-frequency electrical signal components, said second optical local component having a predetermined frequency differential [[from]] relative to a predetermined frequency of the first optical local component;

means for selecting a first high-frequency electrical signal component ~~which consists of two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process; and~~ from said plural high-frequency electrical signal components, said first high-frequency electrical signal component including a frequency-shifted carrier component obtained from the combining of the modulated optical signal with the first optical local component and including a frequency-shifted sideband component obtained from the combining of the modulated optical signal with the second optical local component;

means for combining the frequency-shifted carrier component and the frequency-shifted sideband component;

means for selecting a second high-frequency electrical signal component ~~whose~~ having a frequency [[is]] lower by an amount of the predetermined frequency differential

[[than]] relative to a carrier frequency of the first high-frequency electrical signal component ~~obtained by the optical frequency mixing process~~; and

means for demodulating to provide an output high-frequency signal using the second high-frequency electrical signal component.

Claim 7 (Withdrawn): An apparatus for transmitting high-frequency signals in an optical communication system, the apparatus comprising:

means for transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

means for extracting an original high-frequency signal from the transmitted optical signal;

means for combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

means for making a carrier frequency of the extracted original high-frequency signal coincide with the predetermined frequency differential; and

means for selecting two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process.

Claim 8 (Withdrawn): An apparatus for transmitting high-frequency signals in an optical communication system, the apparatus comprising:

means for transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

means for combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

means for selecting, as a second optical signal, lights containing the optical carrier component included in the optical signal and the second optical local component from the local light source; and

means for selecting a signal with a relatively low frequency after mixing the first and second optical signals.

Claim 9 (Currently Amended): An apparatus according to ~~any one of claims 5 to 8~~ claim 5 or claim 6, further comprising:

means for generating ~~an optical carrier component~~ the optical signal with a single-mode light source that produces a single-mode optical carrier; and

means for generating ~~an optical sideband component~~ the modulated optical signal, ~~obtained~~ by modulating the optical ~~carrier component~~ signal by [[a]] the high-frequency signal by ~~means of~~ optical modulation.

Claim 10 (Currently Amended): An apparatus according to ~~any one of claims 5 to 8~~ claim 5 or claim 6, wherein the means for combining ~~means has a configuration that~~ projects plural light beams onto a photo-detector to ~~be combined and extracts at least part of~~

~~combined optical signal as~~ combine the plural light beams and convert the combined beams to the electrical ~~signals~~ signal.

Claim 11 (Original): An apparatus according to claim 10, wherein the photo-detector has a configuration of a balanced receiver.

Claim 12 (Currently Amended): An apparatus according to ~~any one of claims 5 to 8~~ claim 5 or claim 6, wherein the local light source comprises:

means for generating the first optical local component ~~from the local light source~~ and the second optical local component ~~from the local light source having the predetermined frequency differential from the first local light uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 13 (Currently Amended): An apparatus according to ~~any one of claims 5 to 8~~ claim 5 or claim 6, wherein the local light source comprises:

means for generating the first optical local component ~~from the local light source~~ and the second optical local component ~~from the local light source having the predetermined frequency differential from the first optical local component uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source with an optical injection locking.

Claim 14 (Currently Amended): An apparatus according to ~~any one of claims 5 to 8~~ claim 5 or claim 6, wherein the local light source comprises:

means for generating the first optical local component ~~from the local light source~~ and the second optical local component ~~from the local light source having the predetermined frequency differential from the first optical local component uses a method that utilizes~~; and

a light source that emits two adjacent ~~lightwaves~~ light waves.

Claim 15 (Currently Amended): An apparatus according to ~~any one of claims 5 to 8~~ claim 5 or claim 6, wherein the local light source comprises:

means for generating the first optical local component ~~from the local light source~~ and the second optical local component ~~from the local light source having the predetermined frequency differential from the first optical local component uses a method of~~; and

means for selectively producing two light waves by modulating light from a single-mode light source.

Claim 16 (Currently Amended): A method ~~for transmitting high frequency signals in an optical communication system, the method~~ comprising the steps of:

modulating an optical signal with a high-frequency signal and sending the modulated optical signal;

receiving the modulated optical signal;

combining [[an]] the received modulated optical signal, a first optical local component from a local light source and a second optical local component from the local light source to produce an electrical signal which includes plural high-frequency electrical signal components, said second optical local component having a predetermined frequency differential [[from]] relative to a predetermined frequency of the first optical local component;

~~selecting a first signal which comprises two predetermined signal components from plural signal components obtained by a signal mixing process; and~~

~~mixing the two signal components contained in the selected first signal~~

selecting from said plural high-frequency electrical signal components a frequency-shifted carrier component obtained from the combining of the modulated optical signal with the first optical local component and a frequency-shifted sideband component obtained from the combining of the modulated optical signal with the second optical local component; and

combining the frequency-shifted carrier component and the frequency-shifted sideband component.

Claim 17 (Currently Amended): The method according to claim 16, wherein the ~~plural signal components are obtained by an optical frequency mixing process to form the first signal as~~ combined frequency-shifted carrier component and the frequency-shifted sideband component form a first high-frequency electrical signal component.

Claim 18 (Currently Amended): The method according to claim 17, further comprising the step of:

selecting a second high-frequency electrical signal component ~~whose~~ having a frequency [[is]] lower by an amount of the predetermined frequency differential [[than]] relative to a carrier frequency of the first high-frequency electrical signal component ~~obtained by the optical frequency mixing process~~.

Claim 19 (Withdrawn): The method according to claim 16, wherein the first and second optical local components are generated using an original high frequency signal extracted from the high frequency signals transmitted.

Claim 20 (Currently Amended): The method according to claim 16, wherein the step of selecting ~~the first signal~~ and the step of ~~mixing the two signal~~ combining the frequency-shifted carrier component and the frequency-shifted sideband component ~~components~~ are substituted with the steps of selecting a first optical signal and a second optical signal, mixing the first and second optical signals and selecting a signal with a lower frequency, in which the first optical signal is light ~~containing~~ including an optical sideband component included in the ~~first optical signal and~~ the first optical local component from the local light source, and the second optical signal is light ~~containing~~ including an optical carrier component included in the ~~second optical signal and~~ the second optical local component from the local light source.

Claim 21 (Currently Amended): An apparatus ~~for transmitting high frequency signals in an optical communication system, the apparatus~~ comprising:

means for modulating an optical signal with a high-frequency signal and sending the modulated optical signal;

means for receiving the modulated optical signal;

means for combining [[an]] the received modulated optical signal, a first optical local component from a local light source and a second optical local component from the local light source to produce an electrical signal that includes plural high-frequency electrical signal components, said second optical local component having a predetermined frequency

differential [[from]] relative to a predetermined frequency of the first optical local component;

means for selecting ~~a first signal which contains two predetermined signal components from plural signal components obtained by an optical frequency mixing process~~ from said plural high-frequency electrical signal components a frequency-shifted carrier component obtained from the combining of the modulated optical signal with the first optical local component and a frequency-shifted sideband component obtained from the combining of the modulated optical signal with the second optical local component; and

means for ~~mixing~~ combining the ~~two signal components contained in the selected first signal~~ frequency-shifted carrier component and the frequency-shifted sideband component.

Claim 22 (Currently Amended): The apparatus according to claim 21, wherein the ~~plural signal components are obtained by the optical frequency mixing process to form the first signal as~~ combined frequency-shifted carrier component and the frequency-shifted sideband component form a first high-frequency electrical signal component.

Claim 23 (Currently Amended): The apparatus according to claim 22, further comprising:

means for selecting a second high-frequency electrical signal component ~~whose~~ having a frequency [[is]] lower by an amount of the predetermined frequency differential [[than]] relative to a carrier frequency of the first high-frequency electrical signal component ~~obtained by the optical frequency mixing process~~.

Claim 24 (Currently Amended): The apparatus according to claim 21, wherein the first and second optical local components are generated using an original high frequency signal extracted from [[the]] high frequency signals transmitted.

Claim 25 (Currently Amended): The apparatus according to claim 21, wherein the means for selecting ~~the first signal~~ and the means for ~~mixing the two signal components~~ combining are substituted with means for selecting a first optical signal and a second optical signal, means for mixing the first and second optical signals and means for selecting a signal with a lower frequency, in which the first optical signal is light ~~containing~~ including an optical sideband component included in the ~~first optical signal and the~~ first optical local component from the local light source, and the second optical signal is light ~~containing~~ including an optical carrier component included in the ~~second optical signal and the~~ second optical local component from the local light source.

Claim 26 (Currently Amended): The apparatus according to claim 22, further comprising:

means for generating ~~an optical carrier component~~ the optical signal with a single-mode light source that produces a single-mode optical carrier; and

means for generating ~~an optical sideband component~~ the modulated optical signal, ~~obtained~~ by modulating the optical ~~carrier component~~ signal by [[a]] the high-frequency electrical signal component by ~~means of~~ optical modulation.

Claim 27 (Currently Amended): The apparatus according to claim 23, further comprising:

means for generating ~~an optical carrier component~~ the optical signal with a single-mode light source that produces a single-mode optical carrier; and

means for generating ~~an optical sideband component~~ the modulated optical signal, ~~obtained~~ by modulating the optical ~~carrier component~~ signal by [[a]] the high frequency signal by ~~means of~~ optical modulation.

Claim 28 (Currently Amended): The apparatus according to claim 24, further comprising:

means for generating ~~an optical carrier component~~ the optical signal with a single-mode light source that produces a single-mode optical carrier; and

means for generating ~~an optical sideband component~~ the modulated optical signal, ~~obtained~~ by modulating the optical ~~carrier component~~ signal by [[a]] the high frequency signal by ~~means of~~ optical modulation.

Claim 29 (Currently Amended): The apparatus according to claim 25, further comprising:

means for generating ~~an optical carrier component~~ the optical signal with a single-mode light source that produces a single-mode optical carrier; and

means for generating an optical sideband component, which is the modulated optical signal, ~~obtained~~ by modulating the optical carrier component by [[a]] the high frequency signal by ~~means of~~ optical modulation.

Claim 30 (Currently Amended): The apparatus according to claim 22, wherein the means for combining ~~has a configuration that~~ projects plural light beams onto a photo-

detector ~~to be combined and extracts at least part of combined optical signal as~~, thereby combining the plural light beams and converting the combined beams to the electrical ~~signals~~ signal.

Claim 31 (Currently Amended): The apparatus according to claim 23, wherein the means for combining ~~has a configuration that~~ projects plural light beams onto a photo-detector ~~to be combined and extracts at least part of combined optical signal as~~, thereby combining the plural light beams and converting the combined beams to the electrical ~~signals~~ signal.

Claim 32 (Currently Amended): The apparatus according to claim 24, wherein the means for combining ~~has a configuration that~~ projects plural light beams onto a photo-detector ~~to be combined and extracts at least part of combined optical signal as~~, thereby combining the plural light beams and converting the combined beams to the electrical ~~signals~~ signal.

Claim 33 (Currently Amended): The apparatus according to claim 25, wherein the means for combining ~~has a configuration that~~ projects plural light beams onto a photo-detector ~~to be combined and extracts at least part of combined optical signal as~~, thereby combining the plural light beams and converting the combined beams to the electrical ~~signals~~ signal.

Claim 34 (Previously Presented): The apparatus according to claim 30, wherein the photo-detector has a configuration of a balanced receiver.

Claim 35 (Previously Presented): The apparatus according to claim 31, wherein the photo-detector has a configuration of a balanced receiver.

Claim 36 (Withdrawn): The apparatus according to claim 32, wherein the photo-detector has a configuration of a balanced receiver.

Claim 37 (Withdrawn): The apparatus according to claim 33, wherein the photo-detector has a configuration of a balanced receiver.

Claim 38 (Currently Amended): The apparatus according to claim 22, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 39 (Currently Amended): The apparatus according to claim 23, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 40 (Currently Amended): The apparatus according to claim 24, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~;and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 41 (Currently Amended): The apparatus according to claim 25, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 42 (Currently Amended): The apparatus according to claim 22, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source with an optical injection locking.

Claim 43 (Currently Amended): The apparatus according to claim 23, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source with an optical injection locking.

Claim 44 (Currently Amended): The apparatus according to claim 24, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source with an optical injection locking.

Claim 45 (Currently Amended): The apparatus according to claim 25, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~; and

means for extracting two ~~desired~~ predetermined continuous waves from an optical spectrum emitted from a pulsed light source with an optical injection locking.

Claim 46 (Currently Amended): The apparatus according to claim 22, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~ that utilizes a light source that emits two adjacent light waves.

Claim 47 (Currently Amended): The apparatus according to claim 23, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~ that utilizes a light source that emits two adjacent light waves.

Claim 48 (Currently Amended): The apparatus according to claim 24, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~ that utilizes a light source that emits two adjacent light waves.

Claim 49 (Currently Amended): The apparatus according to claim 25, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method~~ that utilizes a light source that emits two adjacent light waves.

Claim 50 (Currently Amended): The apparatus according to claim 22, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method of~~; and

means for selectively producing two light waves by modulating light from a single-mode light source.

Claim 51 (Currently Amended): The apparatus according to claim 23, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method of~~; and

means for selectively producing two light waves by modulating light from a single-mode light source.

Claim 52 (Currently Amended): The apparatus according to claim 24, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method of~~; and

means for selectively producing two light waves by modulating light from a single-mode light source.

Claim 53 (Currently Amended): The apparatus according to claim 25, wherein the local light source comprises:

means for generating the first and second optical local components ~~from the local light source uses a method of~~; and

means for selectively producing two light waves by modulating light from a single-mode light source.

Claim 54 (New): A method comprising the steps of:

modulating an optical signal with a high-frequency signal having a frequency f_{RF};

sending the modulated optical signal;

receiving the modulated optical signal;

mixing the received modulated optical signal including a frequency f_1, a first optical local component having a first frequency $f_2 + f_{LO}/2$ from a local light source, and a second optical local component having a second frequency $f_2 - f_{LO}/2$ from the local light source to produce an electrical signal which includes plural electrical components, the first frequency and the second frequency being different from each other by a predetermined frequency differential f_{LO};

selecting a first electrical component from said plural electrical components, said selected first electrical component being a frequency-shifted carrier component having a frequency $f_1 - f_2 + f_{LO}/2$ obtained from the mixing of the modulated optical signal with the first optical local component;

selecting a second electrical component from said plural electrical components, said selected second electrical component being a frequency-shifted sideband component having a frequency $f_1 - f_2 + f_{RF} - f_{LO}/2$ obtained the mixing of the modulated optical signal with the second optical local component;

mixing the first and second electrical components to produce a high-frequency electrical signal having a frequency $f_{RF} - f_{LO}$; and

demodulating to provide an output signal having the frequency f_{RF} with the high-frequency electrical signal having the frequency $f_{RF} - f_{LO}$.